## CLAIMS

1. A receiver operable to detect a synchronisation position for recovering data from a set of received signal samples, said receiver comprising

a filter having an impulse response matched to a predetermined characteristic of the received signal and operable to produce an output signal which is representative of the convolution of the impulse response and said received signal samples,

a synchronisation detector operable to detect said synchronisation position from said filter output signal, and

a data detector operable to detect and recover data from the set of received signal samples from the synchronisation position provided by said synchronisation detector, wherein said synchronisation detector is operable

to represent each of said received signal samples as a positive or negative constant in dependence upon the relative sign of the signal sample, and

to represent each of said samples of said filter impulse response as a positive or negative constant in dependence upon the relative sign of said impulse response samples, and said filter is operable to convolve said impulse response with said received signal samples by logically combining the representation of said received signal samples and said impulse response to produce said output signal.

2. A receiver as claimed in Claim 1, wherein said logical combining of said received signal samples and said impulse response is summing the XOR compliment of the combination of the representation of said received signal samples and said impulse response.

3. A receiver as claimed in Claim 1, wherein said received signal samples are complex samples having real and imaginary components, said filter having a complex impulse response, wherein the synchronisation detector is operable to represent the real and imaginary components of each of the received signal samples as a positive or negative constant in dependence upon the relative sign of the real and imaginary components, and to represent the real and imaginary components of the samples of the filter impulse response as a positive or negative constant in dependence upon the

relative sign of the real and imaginary components, said filter being operable to combine logically the complex samples of said impulse response with the complex received signal samples.

4. A receiver as claimed in Claim 3, wherein said filter is operable to perform said logical combining of said impulse response with said received signal samples in accordance with the following equation:

$$h_m(n).I = \sum_{i=0}^{N_g-1} 2 * \overline{XOR}(f_m(n-i).I, r(n-i).I) - 1$$
$$h_m(n).Q = \sum_{i=0}^{N_g-1} 2 * \overline{XOR}(f_m(n-i).Q, r(n-i).Q) - 1$$

where $\overline{XOR}(a,b)$ is the compliment of XOR(a, b), $h_m(n).I$ is the real part and $h_m(n).Q$ the imaginary part of the complex samples of said output signal.

5. A receiver as claimed in Claim 1, wherein said filter is operable to select a predetermined number of samples of said impulse response of said filter, and to perform the logical combining of said impulse response with said received signal samples only for the selected predetermined number of samples.

6. A receiver as claimed in Claim 5, wherein said selected predetermined number of samples of said filter impulse response are evenly distributed over the temporal length of said impulse response.

7. A receiver as claimed in Claim 6, wherein said predetermined number is an integer fraction $1/M$ of the total number of samples of said impulse response.

8. A receiver as claimed in Claim 4, wherein said logical combining is calculated in accordance with the following equation:

$$h_m(n).I = \sum_{i=0}^{N_g/4-1} 2 * \overline{XOR}(f_m(n-Mi).I, r(n-Mi).I) - 1$$
$$h_m(n).Q = \sum_{i=0}^{N_g/4-1} 2 * \overline{XOR}(f_m(n-Mi).Q, r(n-Mi).Q) - 1$$

wherein $M$ is the integer in the previous claim.

9. A receiver as claimed in Claim 1, wherein said output signal has a plurality of temporally separated peaks, said synchronisation detector being operable to pre-process said output signal by identifying the temporal position of said peaks within said output signal which have an amplitude which is less than a pre-determined threshold, and setting the value of said output signal to a predetermined default value at said identified temporal positions, said sync position being determined from said pre-processed output signal.

10. A receiver as claimed in Claim 9, wherein said default value is zero.

11. A receiver as claimed in Claim 1, wherein said predetermined characteristic of said set of received signal samples is a sub-set of samples which are predetermined, said impulse response of said filter being matched to the signal samples corresponding to the data which is predetermined.

12. A receiver as claimed in Claim 11, wherein said predetermined data is a data sequence known at the receiver.

13. A receiver as claimed in Claim 11, wherein said predetermined data is a copied set of data from another part of said data bearing signal samples.

14. A receiver as claimed in Claim 1, wherein said synchronisation detector is operable to pre-process said output signal by

locating the relative temporal position of the maximum peak within said output signal,

identifying for each other peak sample of said output signal another sample of said output signal at an opposite corresponding temporal displacement with respect to said relative temporal position of said maximum peak, and comparing said two samples and replacing the lower of the two samples with zero.

15. A receiver as claimed in Claim 1, wherein said receiver is operable to process a plurality of said sets of received signal samples, said synchronisation detector being operable to combine said output signal from said synchronisation detector for each of a plurality of sets of received signal samples, and to estimate said synchronisation position from a peak value of said combined output signal.

16. A method of detecting a synchronisation position for recovering data from a set of received signal samples, said method comprising the steps of

representing each of said received signal samples as a positive or negative constant in dependence upon the relative sign of said received signal samples,

representing each sample of a filter impulse response matched to a predetermined characteristic of the received signal as a positive or negative constant in dependence upon the relative sign of said impulse response samples,

filtering said received signal samples with said impulse response by forming a representation of the convolution by logically combining the representation of said received signal samples and said impulse response to produce an output signal, and

detecting said synchronisation position from said output signal.

17. A method as claimed in Claim 16, wherein said logical combining of said received signal samples and said impulse response comprises summing the XOR compliment of the combination of the representation of said received signal samples and said impulse response.

18. A method as claimed in Claim 16, wherein said received signal samples are complex samples having real and imaginary components, said representing said received signal samples as a positive or negative constant comprises representing the real and imaginary components of each of the received signal samples as a positive or negative constant in dependence upon the relative sign of the real and imaginary components, and said representing said impulse response samples as a positive or negative constant comprises representing the real and imaginary components of the

samples of the filter impulse response as a positive or negative constant in dependence upon the relative sign of the real and imaginary components, said logical combining being combining logically the complex samples of said impulse response with the complex received signal samples.

19. A method as claimed in Claim 18, wherein said filtering comprises performing the convolution of said impulse response with said received signal samples in accordance with the following equation:

$$h_m(n).I = \sum_{i=0}^{N_g-1} 2 * \overline{XOR}\left(f_m(n-i).I, r(n-i).I\right) - 1$$
$$h_m(n).Q = \sum_{i=0}^{N_g-1} 2 * \overline{XOR}\left(f_m(n-i).Q, r(n-i).Q\right) - 1$$

where $\overline{XOR}(a,b)$ is the compliment of XOR(a, b), $h_m(n).I$ is the real part and $h_m(n).Q$ the imaginary part of the complex samples of said output signal.

20. A method as claimed in Claim 17, wherein said filtering comprises

selecting a predetermined number of samples of said impulse response of said filter, and

performing the logical combining of said impulse response with said received signal samples only for the selected predetermined number of samples.

21. A method as claimed in Claim 20, wherein said selected predetermined number of samples of said filter impulse response are evenly distributed over the temporal length of said impulse response.

22. A method as claimed in Claim 21, wherein said predetermined number is an integer fraction *1/M* of the total number of samples of said impulse response.

23. A method as claimed in Claim 20, wherein said logical combining is calculated in accordance with the following equation:

$$h_m(n).I = \sum_{i=0}^{N_g/4-1} 2*\overline{XOR}(f_m(n-Mi).I, r(n-Mi).I)-1$$

$$h_m(n).Q = \sum_{i=0}^{N_g/4-1} 2*\overline{XOR}(f_m(n-Mi).Q, r(n-Mi).Q)-1$$

where $M$ is the integer described in the previous claim.

24. A computer program providing computer executable instructions, which when loaded onto a computer configures the computer to operate as a receiver as claimed in Claim 1.

25. A computer program providing computer executable instructions, which when loaded on to a computer causes the computer to perform the method according to Claim 16.

26. A computer program product having a computer readable medium with information signals recorded thereon which are representative of the computer program claimed in Claim 24.

27. A computer program product having a computer readable medium on which is recorded information signals representative of the computer program claimed in claim 25.